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Updates:

Database Foundations

2-6

Relationships and Foreign Keys



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Roadmap

What Is a
Table?

Relational
Databases

Conceptual
Data Modeling



Data Modeling
Terminology

Unique
Identifiers and
Primary Keys

Relationships
and Foreign Keys

You are here

Objectives

This lesson covers the following objective:

- Define and recognize examples of relationships and corresponding foreign keys



Relationships

- Relationships represents an association between two or more entities.
- These lines are either solid or dashed.
- These lines terminate in either a "single toe" or a "crow's foot."

In a conceptual data model, a relationship is any association, linkage, or connection between the entities of interest to the business. It is a two-directional, significant association between two entities or between an entity and itself. Each relationship has a name, an optionality (optional or mandatory), and a degree (cardinality).

A relationship is identified by a name that is descriptive of the relationship. The relationship name is usually an active or a passive verb. Relationships between entities can always operate in both directions.

For example:

- **Active verb:** A teacher teaches a class.
- **Passive verb:** A class is taught by a teacher.

Relationships

- The name of the relationship, from either perspective, is printed near the starting point of the relationship line.
- Examples:
 - EMPLOYEES have JOBS.
 - JOBS are held by EMPLOYEES.

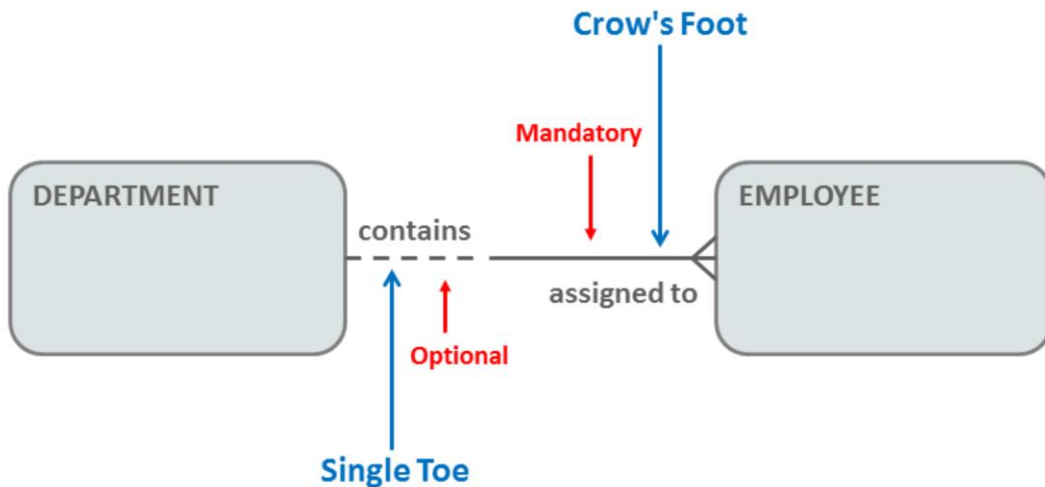
In a conceptual data model, a relationship is any association, linkage, or connection between the entities of interest to the business. It is a two-directional, significant association between two entities or between an entity and itself. Each relationship has a name, an optionality (optional or mandatory), and a degree (cardinality).

A relationship is identified by a name that is descriptive of the relationship. The relationship name is usually an active or a passive verb. Relationships between entities can always operate in both directions.

For example:

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- **Passive verb:** A class is taught by a teacher.

Relationship Examples



A solid line represents the mandatory relationship, and a dashed line represents the optional relationship.

When reading the business rule sentence, use the following words for the minimum values:

- **Optional:** Use "may be" or "may."
- **Mandatory:** Use "must be" or "must."

And use the following words for the maximum values:

- **Line:** Use "one and only one."
- **Crow's feet:** Use "one or more."

Foreign Key

- A foreign key (FK) is a column or a combination of columns in one table that refers to a primary key in the same table or another table.
- Relationships in a conceptual data model are mapped to foreign keys in a database table.

A foreign key is a column or combination of columns in one table that uniquely identifies a row in another table. The foreign key is defined in a second table, but it refers to the primary key in the first table.

In a conceptual data model, relationships are mapped to foreign keys in a database table so that tables can reference each other. In the examples shown in this lesson, the crow's foot on the `EMPLOYEE` entity maps to a foreign key column in the `EMPLOYEES` table. All relationships from a conceptual data model map to a foreign key column in a database table.

Foreign Key Examples

EMPLOYEES

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	DEPARTMENT_ID
100	Steven	King	90
101	Neena	Kochhar	90
102	Lex	De Haan	90
103	Jennifer	Whalen	10

Foreign
Key

refers to

DEPARTMENTS

Primary Key →

DEPARTMENT_ID	DEPARTMENT_NAME
10	Administration
20	Marketing
50	Shipping

In this slide example, a company's database `DEPARTMENTS` table stores department data with a primary key column named `DEPARTMENT_ID`. It also stores department data in an `EMPLOYEES` table, which holds information about various departments and associated employees.

To link these two tables and determine employee and department information, a corresponding `DEPARTMENT_ID` column must be inserted in the `EMPLOYEES` table to reference existing department IDs in the `DEPARTMENTS` table. In this case, the `DEPARTMENT_ID` column in the `EMPLOYEES` table is a foreign key that references a column that has the same name in the `DEPARTMENT` table. This is an example of a relationship between two tables.

Summary

In this lesson, you should have learned how to:

- Define and recognize examples of relationships and corresponding foreign keys.





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